Internal Seminar

Re-entrant orientational correlations of colloids in a random potential energy landscape

Naddi Shankaraiah

TCIS, Hyderabad

We preset Monte Carlo simulations of model Hamiltonians: (i) inverse-twelfth power potential [1]; and (ii) inverse-twelfth power potential with added random potential [2], to study the structure of fluids. The random potential energy landscape [3,4,5] has a Gaussian distribution with zero mean and exponentially decaying correlations. After a quench and equilibration, we monitor time-averaged local particle density and time-averaged hexatic order parameter to obtain density correlations and orientational correlations. We find, with disorder, a re-entrant behaviour in orientational correlations and linear behaviour in density correlations for different densities.

References:

[1] J.Q. Broughton, G. H. Gilmer, and J.D. Weeks, Phys. Rev. B. 25, 4651 (1982).
[2] A. Sengupta, S. Sengupta, and G.I. Menon, Europhys. Lett., 70, 635 (2005).
[3] E. M. Chudnovsky and R. Dickman, Phys. Rev. B. 57, 2724 (1998).
[4] J. Bewerunge, A. Sengupta, R. F. Capellmann, F. Platten, S. Sengupta, S. U. Egelhaaf, J. Chem. Phys. 145, 044905 (2016).
[5] J.D. Bryngelson and P.G. Wolynes, J. Phys. Chem. 93 6902 (1989).

Monday, Jul 30th 2018
2:30 PM (Tea/Coffee at 2:00 PM)
Seminar Hall, TIFR-H